



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------|------------------|
| 09/773,962 | 02/01/2001 | Brian Edward Causton | 08935-238001 / M-4952 | 6298 |
| 26161 | 7590 | 07/09/2004 | EXAMINER | |
| FISH & RICHARDSON PC 225 FRANKLIN ST BOSTON, MA 02110 | | | DOVE, TRACY MAE | |
| | | ART UNIT | PAPER NUMBER | |
| | | 1745 | | |
| DATE MAILED: 07/09/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-----------------|----------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/773,962 | CAUSTON ET AL. |
| | Examiner | Art Unit |
| | Tracy Dove | 1745 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 22 April 2004.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-3,5,6,8-14,16,19,21-23,26,29-34,36-61,63-68 and 71-74 is/are pending in the application.
- 4a) Of the above claim(s) 41-50,55-61 and 63-67 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-3,5,6,8-14,16,19,21-23,26,29-34,36-40,51-54,68 and 71-74 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date: _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 4/22/04. Applicant's arguments have been considered, but are not persuasive. Claims 1-3, 5, 6, 8-14, 16, 19, 21-23, 26, 29-34, 36-61, 63-68 and 71-74 are pending. Claims 41-50, 55-61 and 63-67 have been withdrawn as being directed to a nonelected invention. This Action is made FINAL, as necessitated by amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 5, 6, 8-13, 51, 52 and 68 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 has been amended to recite "openings arranged to provide gas to a surface of the cathode, which gas, upon first contacting the surface of the cathode, forms first fluxes of gas that overlap on the surface of the cathode to form a generally non-circular second flux of gas on the surface of the cathode", which is not supported by the specification as filed. As shown in at least Figures 8, 9 and 14 of the instant specification, the gas entering through the openings do not, upon first contacting the surface of the cathode, form first fluxes of gas that overlap on the surface of the cathode. As stated in the specification and as shown in the figures, the "non-circular second flux of gas" is formed by diffusion (spreading of gas after initial contact

with the cathode surface) of the first fluxes of gas. Neither the specification nor the figures support first fluxes of gas that overlap during initial contact with the cathode surface.

Claims 32-34 and 36-40 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a button cell having a single elongated curved slot having a diameter of 0.60 mm to about 20.00 mm, does not reasonably provide enablement for a button cell having multiple elongated curved slots having a diameter of 0.60 mm to about 20.00 mm. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. The specification recites various dimensions for button cells on page 12, lines 6-17. The largest disclosed diameter for a button cell is between about 11.25 to 11.60 mm. Button cells are commonly available in a variety of sizes. The diameter of commonly available button cells ranges from 5.84 to 30.56 mm (page 13.6 of Linden, Handbook of Batteries). Thus, the specification does not enable a button cell having multiple rows, symmetrically positioned slots or radially extending slots as recited by claims 32-34 and 36-40. For example, the specification does not enable a button cell having 4-12 20mm diameter slots symmetrically positioned because button cells do not have such a large diameter.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 16, 19, 21-23, 26, 29-34, 36-40, 54, 73 and 74 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 improperly broadens claim 14. An aspect ratio of 5:1 is not between 15:1 to 400:1.

Claim 19 recites “an elongated curved slot having a dimension of from 0.60 mm to about 20.00mm”, which is unclear. Examiner suggests the claim be amended to recite “an elongated curved slot having a length of from 0.60 mm to about 20.00mm”, as described on page 10 of the specification.

Claims 73 and 74 recite “the elongated curved slot has a dimension”, which is unclear. Examiner suggests the claim be amended to recite “an elongated curved slot having a length”, as described on page 10 of the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1, 2, 5, 6, 8-11, 51 and 52 are rejected under 35 U.S.C. 102(e) as being anticipated by Adey et al., US 6,284,400 B1.

Adey teaches a metal-air cell having one or more air entry ports located in the bottom of the cathode can to provide for entry of oxygen-rich air into the cathode can. The air ports are distributed over the bottom of the cathode can, opposite the reaction surface of the cathode assembly. See abstract. Figure 1 shows a zinc-air cell (button cell) having a housing containing an anode can 12 electrically insulated from a cathode can 14 by a seal 16. Barrier layer 19

(separator) spaces the reactive anode material 31 from the cathode assembly 18 (see col. 6, lines 31-48). As oxygen enters the port, the oxygen spreads out over substantially the entire reaction surface 54 (of the cathode assembly), supplying necessary cathodic oxygen to the reaction surface. Figure 4 shows the spreading of oxygen over the reaction surface, which was known prior to the invention by Adey. This figure shows a circular flux of gas facilitated by the opening shown in prior art Figure 4. Figures 2 and 5 depict the spreading of oxygen over the reaction surface by the inventive air ports of Adey. As can be seen in Figures 2 and 5, the flux of gas as a whole (second flux) facilitated by the openings is generally non-circular. See col. 7, lines 40-62. Each of the 7 larger circles in the central portion of Figure 2 represents the outer edge of the imaginary enclosed area 56 of a corresponding plume 58 at the intersection of the plume with the reaction surface of the cathode. The circles are, of course, visually imaginary and thus are not visible on reaction surface 54 (col. 7, lines 49-62). The oxygen, of course, diffuses throughout the air reservoir to reach all areas of the entire reaction surface (first fluxes of gas overlap) (col. 7, lines 63-col. 8, lines 3). As can be clearly seen in the figures, the openings are not louvers and are symmetrical. The ports are preferably evenly spaced with respect to each other (col. 3, lines 18-20). Adey discusses the port size with respect to diameter, implying a circular port opening, which is preferred. However, any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. While some modest adaptation of Adey would be suggested by different port shapes, the same principles apply to such divergent shapes. In general, ports in the cathode cans range in size from anything greater than zero up to about 0.017 inch (greater than 0 to 0.43 mm). See col. 14, lines 8-17.

Table 1 discloses that the number of ports may be 1-13 and Figure 2 shows seven openings in the cathode can defining rows.

Thus the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 12-14, 16, 19, 21-23, 26, 29-34, 36-40, 53, 54, 68 and 71-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adey et al., US 6,284,400, as evidenced by Linden, Handbook of Batteries.

See discussion of Adey above.

Regarding claims 3 and 68, Adey does not explicitly teach that the opening may be in the shape of a rectangle (elongated straight opening) or that the opening provides a flux of gas in a curvilinear shape.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Adey suggests that the opening may have a rectangular shape. Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. While some modest adaptation of Adey would be suggested by different port shapes, the same principles apply to such divergent shapes. Thus, Adey teaches and suggests modifying the disclosure to provide for openings having different shapes. One of skill would find a rectangular shape obvious in view of the

teaching of a square shape by Adey. Furthermore, Adey suggests a curvilinear shape because Adey teaches the opening may have any shape such as irregular.

Regarding claims 14, 16, 53 and 71-72 note an aspect ratio of greater than 1 indicates an elongated shape such as a rectangle or an oval. Shapes such as a square or a circle would not have an aspect ratio of greater than 1. Adey teaches an elliptical/oval shape, which is an elongated shape having a curved edge and would inherently have an aspect ratio of greater than 1. Adey does not explicitly teach the claimed aspect ratios. However, Adey teaches at least openings having an aspect ratio greater than 1. Adey suggests that the port/opening size may be varied depending upon the size of the reaction surface. In general, the smaller the area of the reaction surface to be supported by each port, the smaller the port size can be (col. 13, lines 41-50). The specific number of ports and the specific size of the ports, will of course, depend on the size of the cell (reaction surface) and the performance characteristics demanded of the cell (col. 14, lines 1-4). Adey teaches that it is the total area of the ports that is important. Thus, ports having different aspect ratios would have been obvious to one of ordinary skill because, for example, different sized rectangles or ovals can have the same total area. One of skill would be motivated to modify Adey because Adey teaches and suggests that the size of the opening depends upon the size of the cell (reaction surface) and the performance characteristics demanded of the cell.

Regarding claims 12, 13 and 30, Adey does not explicitly teach that the battery is a button cell or a prismatic cell. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the skilled artisan would have known that metal-air cells generally have a button or prismatic shape. This is

evidenced by Linden, which teaches metal-air cells may have a button or prismatic shape. A prismatic design is shown in Figure 38.2 of Linden. Linden teaches a button cell is used to package a metal-air battery of small size, while a prismatic cell is used to package a metal-air battery of large size (see page 38.7). Thus, the skilled artisan would be motivated to use a button cell or a prismatic cell depending upon the desired size of the cell.

Regarding claim 19, Adey does not explicitly teach an elongated curved slot wherein the opening is not a louver. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the courts have ruled that changes in form or shape are obvious without evidence that the particular shape is significant or is anything more than one of numerous configurations a person of ordinary skill in the art would find obvious. In re Dailey, 149 USPQ 47 (CCPA 1976). Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. One of skill would find the elongated curved slot that is not a louver obvious in view of the teaching by Adey that the openings may have any shape such as an irregular shape.

Response to Arguments

Applicant's arguments filed 4/22/04 have been fully considered but they are not persuasive.

Adey

Applicant argues Adey does not teach or suggest the battery recited in claim 1 because the cathode can openings in Adey provide circular fluxes of oxygen that do not overlap with each other on the surface of the cathode. Applicant points to Figure 2 of Adey. Examiner points out the claim 1 has been rejected under 35 U.S.C. 112, 1st, for containing new matter. Regarding

Adey, the teaching of the reference are not limited to the specific embodiment shown in Figure 2. Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc.

Regarding at least claim 14, Applicant argues the teaching of an elliptical or oval shape by Adey does not equate to the teaching of an aspect ratio that, at a minimum, is as high as 15:1. Examiner did not state the teaching of an elliptical or oval shape by Adey “equates” to the teaching of an aspect ratio of 15:1. Specifically, an anticipation rejection was not made. Claim 14 was rejected as being obvious in view of Adey. Adey teaches an elliptical/oval shape, which is an elongated shape having a curved edge and would inherently have an aspect ratio of greater than 1. Adey does not explicitly teach the claimed aspect ratios. However, Adey teaches at least openings having an aspect ratio greater than 1. Adey suggests that the port/opening size may be varied depending upon the size of the reaction surface. In general, the smaller the area of the reaction surface to be supported by each port, the smaller the port size can be (col. 13, lines 41-50). The specific number of ports and the specific size of the ports, will of course, depend on the size of the cell (reaction surface) and the performance characteristics demanded of the cell (col. 14, lines 1-4). Adey teaches that it is the total area of the ports that is important. Thus, ports having different aspect ratios would have been obvious to one of ordinary skill because, for example, different sized rectangles or ovals can have the same total area. One of skill would be motivated to modify Adey because Adey teaches and suggests that the size of the opening depends upon the size of the cell (reaction surface) and the performance characteristics demanded of the cell.

Regarding at least claim 19, Applicant argues that Adey does not suggest an elongated curved slot having a length of 0.60 mm to about 20.00 mm. While Adey does not explicitly teach an elongated curved slot having the specific length, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the courts have ruled that changes in form or shape are obvious without evidence that the particular shape is significant or is anything more than one of numerous configurations a person or ordinary skill in the art would find obvious. In re Dailey, 149 USPQ 47 (CCPA 1976). Adey teaches any shape opening can be used, such as square (straight opening), elliptical (oval or elongated circle), irregular, etc. One of skill would find the elongated curved opening that is not a louver obvious in view of the teaching by Adey that the openings may have any shape such as an irregular shape.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 6, 2004



STEPHEN KALAFUT
PRIMARY EXAMINER
GROUP 1700